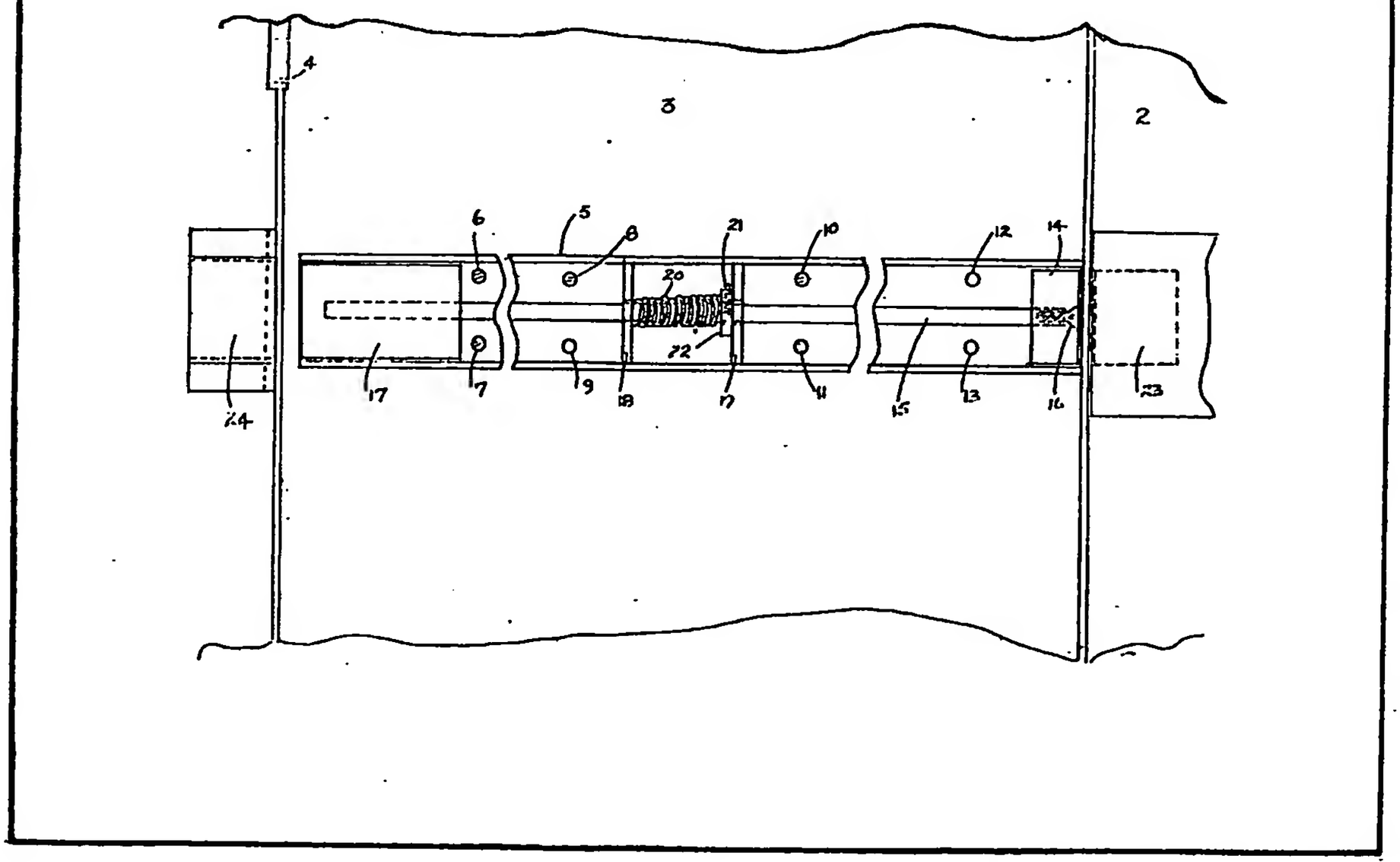
(12) UK Patent Application (19) GB (11) 2 045 331 A

(21) Application No 7910415
(22) Date of filing 24 Mar 1979
(43) Application published
29 Oct 1980
(51) INT CL³
E05C 9/00
(52) Domestic classification
E2A 120 420 AK
(56) Documents cited
None
(58) Field of search
E2A

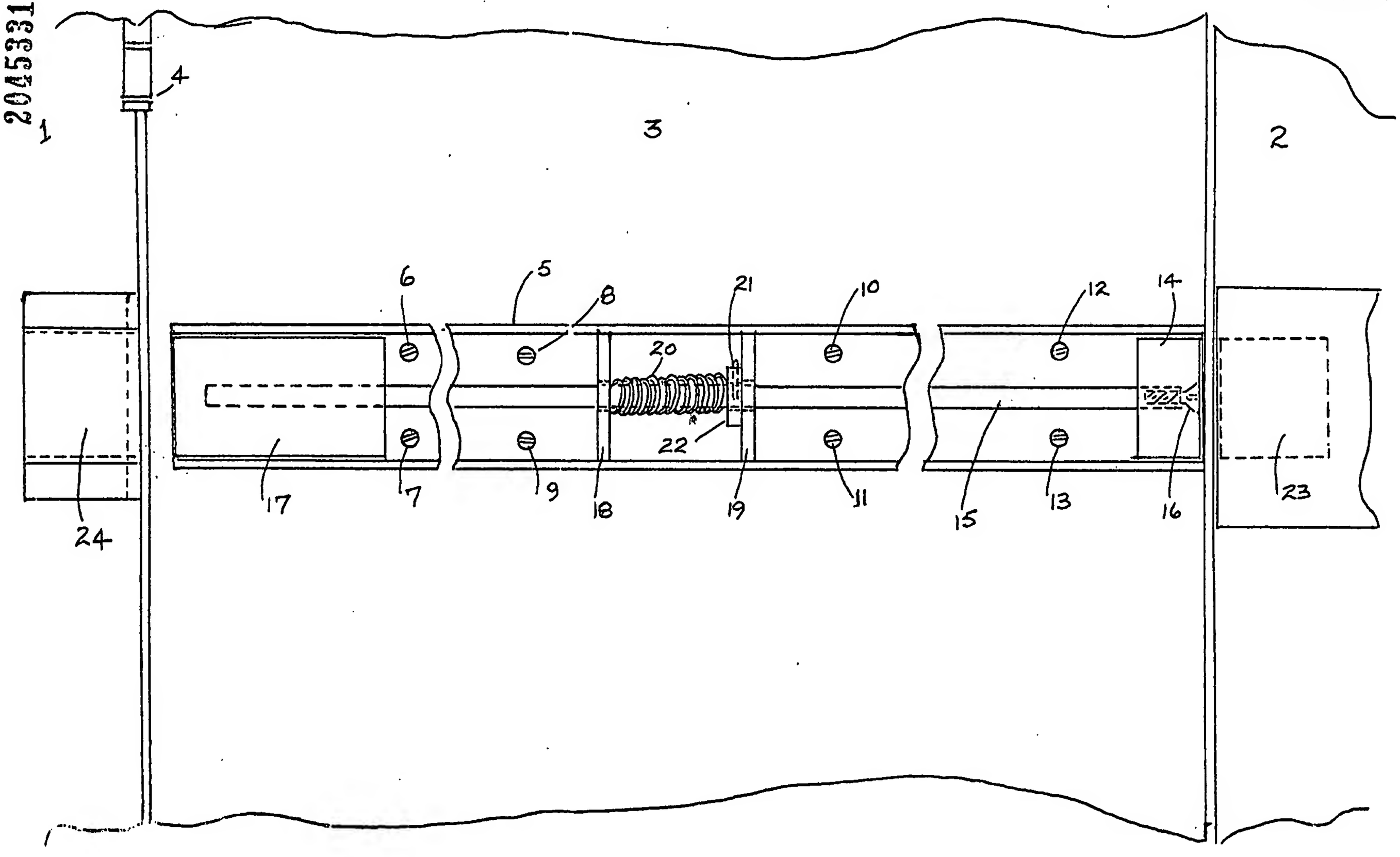
(71) Applicant
Edward O'Hanlon, 61,
Meadow St., Treforest,
Pontypridd, Mid-
Glamorgan
(72) Inventor
Edward O'Hanlon

(54) Bar Locking Mechanism

(57) A bar locking mechanism is designed to be attached in such a manner to a door or window or other such closure that the said mechanism encompasses the full width of the closure. It comprises a housing 5 attachable to the back surface of the closure, or inside the closure if it is hollow, supporting a rod 15 which connects a receiver bolt 14 to a transmitter bolt 17. A lock or other fastening 23 is located on door post 2 so that, when its bolt projects, it forces the receiver bolt 14 and rod 15 leftwards against spring 20, thus pushing transmitter bolt 17 into a taper 24 on the other door post 1.



2045331



SPECIFICATION

A Bar Locking Mechanism

This description refers to a new form of locking mechanism. The mechanism may be used with a lock or other locking device to assist in locking and strengthening any moveable door, window, hatch, or other moveable barrier used for closing an aperture. In a preferred embodiment, the mechanism is mounted on the rear or inside surface of a standard door. When fitted to a hollow wooden door, the mechanism may be mounted within the two outside panels of the door. The mechanism is mounted horizontally from the lock edge of the door to the hinge edge of the door. The mechanism consists of a rod of suitable length to the ends of which are attached two bolts of suitable length and otherwise of similar dimensions to bolts used in traditional door locks. The bolt attached to the end of the rod closest to the lock edge of the door is the receiver bolt. The bolt attached to the end of the rod closest to the hinge edge of the door is the transmitter bolt. The combined lengths of the receiver bolt, the connecting rod and the transmitter bolt are such that are marginally shorter than the total width of the door to allow for the free movement of the door on its hinges. The receiver and transmitter bolts may be of brass or steel or some other suitable material. The connecting rod may be of aluminium, steel, or other suitable material. The entire mechanism is encased within a protective housing. The transmitter bolt, connecting rod, and receiver bolt are mounted, within their housing, across the back or inside of the door in such a manner that, with the door in a closed position, the bolt and rod assembly is free to slide laterally along supportive guides mounted in a fixed position within the housing. The lateral movement of the bolt and rod assembly, with the door in the closed position, is sufficient to allow the transmitter bolt to extend a sufficient distance beyond the hinge edge of the door, across the small gap between the hinge edge of the door and the side of the door frame onto which the door's hinges are mounted, and into a bolt receiver or receptacle mounted on the back of the door frame at such a height as to make the bolt receiver level with the transmitter bolt and rod assembly and allow for the free lateral movement of the transmitter bolt into and out of the bolt receiver. The bolt and rod assembly is spring mounted within its housing so that when force is applied to the unattached end of the receiver bolt and in a lateral direction, the bolt and rod assembly slides laterally on supportive guides as described above, and so that when such lateral force is removed from the unattached end of the receiver bolt, a spring and collar assembly mounted along the connecting rod between the supportive guides takes over and forces the bolt and rod assembly to slide laterally into its retracted original position. The force required to be applied to the unattached end of the receiver bolt need only be sufficient to overcome the initial opposite force of the spring and collar assembly mounted along the axis of the connecting rod and the normal frictional forces. This force, in practice, can be supplied by either a standard key controlled deadlock or spring bolt door lock mounted within or on the door frame, or by a single or dual door locking mechanism more particularly described in British Patent Application No. 09363, (Serial No. 1561554) submitted 9 March, 1978, or by a door lock more particularly described in a British Patent Application submitted on the same date as this present Application and by the same applicant, or by any other mechanical or electro-mechanical assembly capable of effecting a lateral displacement of the receiver bolt. When the bar locking mechanism is fitted to a hollow wooden door or a specially channeled wooden, metal, or plastic door, the bolt receiver or receptacle must be mortiсed in the hinge side of the door frame, and the door lock, locking mechanism, or other mechanical or electro-mechanical assembly used to displace the receiver bolt must be mortiсed in the lock side of the door frame. In all other applications of the locking mechanism to doors, the locking mechanism is mounted externally to the door, and the bolt receiver or receptacle and the device used to displace the receiver bolt are rim mounted on rear or inside hinge side of the door frame and the rear or inside lock side of the door frame respectively. In a particularly preferred embodiment, two bar locking mechanisms are mounted within or on the rear or inside surfaces of a door, one bar locking mechanism being mounted horizontally approximately one third of the total height of the door from the top of the door and the other bar locking mechanism being mounted horizontally approximately one third of the total height of the door from the bottom of the door. In this particularly preferred embodiment, two bolt receivers or receptacles, mortiсed within, or rim mounted on, the hinge side of the door frame dependent upon whether the bar locking mechanisms are encased within the door or mounted on the rear or inside surface of the door, are required. The two bolt receivers or receptacles are mounted at a height from the floor and at a depth along the hinge side of the door frame sufficient to allow free entry and exit of the two transmitter bolts. In the particularly preferred embodiment, the means of displacement of the receiver bolt, which means would be mortiсed or rim mounted dependent upon the manner in which the bar locking mechanism is mounted to the door, would be either two separate door locks mounted on the door frame, or the dual unit described in British Patent Application No. 09363, or the dual unit described in the British Patent Application submitted on the same date as the present Application and by the same applicant, or some other mechanical or electro-mechanical device capable of laterally displacing the receiver bolts of two bar locking mechanisms mounted to the same door.

The present bar locking mechanism differs

from the locking mechanisms that have preceded it in that it is an ancillary mechanism to be used in conjunction with a lock or locking device. It is not a lock itself. Also, the present mechanism differs in that it is activated by some other lock or locking device situated in or on the door frame. Traditionally, standard key controlled locks are contained in or on the door itself. The traditional arrangement has prevented the use of a mechanism such as the present one, i.e. a locking mechanism activated by a lock situated other than on the door. A bar locking mechanism such as the present one would not have been practical in terms of locking and strengthening qualities had it been activated by a door mounted lock because the bar locking mechanism would not have had a direct anchor point in or on the door frame. One or more anchor points in or on the door frame are essential to the practicality of the present mechanism as they obviate the weaknesses inherent in an arrangement with a door mounted lock and one effective anchor point on the door frame. The idea of a bar lock across the rear or inside surface of a closed door and with anchor points on both sides of the door frame is ancient, but it became less practical with an increased need to lock a door from the outside and the advent of key controlled devicesto effect such locking. These key controlled locks were initially installed in or on the door because of a combination of reasons: the locking mechanism was too wide to be contained within the door frame, and the door was the only other place to put it; the door frame was too narrow to accommodate the bulk of the locking mechanism without structural alterations to the adjacent wall, the need for a handle on the door made it convenient to locate the handle and the lock within the same mechanism. The idea of a key controlled door mounted lock was the standard for hundreds of years and still is today.

Now developments have occurred which make the present bar locking mechanism practical. Now there are locking devices which are slim enough to be installed in door frames. Door frames are the logical places to put locks. They are static, unlike doors, and therefore provide a higher degree of protection for the lock mechanism. This is especially true with the advent of aluminum, steel, and rubber mounted door frames. A mechanical example of the new type of locking mechanism slim enough to fit into a door frame is the device described in a British Patent Application submitted on the same date as the present Application and by the same applicant. An electro-mechanical example of a locking mechanism slim enough to be installed in or on a door frame is the electronic combination switch and electro-mechanical door strike or solenoid assembly more particularly described in British Patent No. 1479524. Both of these examples can be installed on or in a door frame and can activate one, two, or more bar locking mechanisms fitted to the same door. In the case of British Patent No. 1479524, there is also the possibility of remote control of bar locking mechanisms.

The advent of door frame mounted locks or locking devices, such as the two described above, in conjunction with the present bar locking mechanism provides certain advantages over the previous arrangements. The bar locking mechanism greatly strengthens the door against outside impact such as the force provided by jemmying, kicking, or shoulder charging. Under impact, a door tends to bend around a single anchor point on the lock edge of the door. Normally, impact is applied above or below the door mounted lock, thus causing a couple about the lock bolt. This twisting action concentrates the force of impact on the single anchor point at the lock bolt with the result that the lock bolt bends, or the wood adjacent to either the lock on the door or the bolt receiver or receptacle on the frame shatters. In the present arrangement, the bar locking mechanism provides greater support to the door. In the preferred embodiment of two bar locking mechanisms fitted to the same door, any twisting action is obviated and the force of impact is much more efficiently distributed through the door, door frame, and adjacent wall. Furthermore, any inward bending of the middle of the door in a horizontal plane, a frequent occurrence under impact, is obviated. When one further considers that the mounting of some of the locks and locking devices, required for the use of the bar locking mechanism, to the door frame will actually strengthen the door frame itself, and that the existence of two or four or more anchor points on the hinge side of the frame as well as the same number on the lock side of the frame provides much more efficient dispersal of the force of impact throughout the entire door frame, it can be seen that any door locking arrangement incorporating the present bar locking mechanism is vastly superior to previous arrangements.

The bar locking mechanism can be used in conjunction with a frame mounted locking device on aluminum, steel, glass plastic, or rubber mounted doors and frames and the possibility exists of specially built in bar locking mechanisms, frame mounted locks and bolt receivers or receptacles.

The attached drawing explains, in greater detail, the mechanical construction and mode of operation of the bar locking mechanism. To simplify description, each component has been allocated a number. 1 and 2 are the vertical sections of a door frame with accompanying door 3 supported by hinges the upper of which 4 is illustrated. An "U" shaped channel housing 5 is attached to the rear or inside surface of door 3 via bolts 6, 7, 8, 9, 10, 11, 12, and 13. Within the housing 5, is the bolt and rod assembly consisting of the receiver bolt 14 attached to a connecting rod 15 via a bolt 16 countersunk into the receiver bolt 14 so that the unattached end of the receiver bolt 14 nearest vertical door frame 2 is a flat surface. The opposite end of the connecting rod 15 is forcefitted into transmitter bolt 17. Vertical support plates 18 and 19 are fixed within the

housing 5. Vertical plates 18 and 19 are mounted to housing 5 in a central position and have holes drilled into them through which connecting rod 15 passes. The first function of vertical plates 18 and 19 is to support connecting rod 15, and to prevent it from bending under lateral stress. Coiled spring 20 and collar 22 are inserted over and along connecting rod 15 during assembly in such a manner that they end up between the surfaces of vertical plates 18 and 19. Collar 22 is attached to connecting rod 15 by a pin 21. The distance between vertical plates 18 and 19 establishes the lateral traverse of connecting rod 15, transmitter bolt 17, and receiver bolt 14. Some lock or locking device 23 in frame 2 acts as a means of deflecting receiver bolt 14. A bolt receiver or receptacle 24 on frame 1 in such a position that it can receive and anchor transmitter bolt 17 when it extends from housing 5.

In operation, locking device 23 is used, with door 3 in a closed position, to extend across the gap between frame 2 and door 3 and strike receiver bolt 14, deflecting receiver bolt 14 laterally into housing 5. The deflection of receiver bolt 14 causes the lateral displacement of connecting rod 15 through and along vertical support plates 18 and 19 and consequently the lateral displacement of transmitter bolt 17 out of housing 5, across the gap between door 3 and frame 1, and into receiver or receptacle 24. When locking device 23 is returned from its deflecting position, compressed spring 20, compressed between vertical plate 18 and collar 22, forces connecting rod 15, attached to collar 22 via pin 21, to return laterally along and through vertical support plates 18 and 19 to its original position, thereby retreiving transmitter bolt 17 from receiver or receptacle 24 and allowing door 3 to open.

The result of this operation is that, in effect, a solid bar has been placed across the back of door 3 between frame sections 1 and 2, thus preventing the door from opening and strengthening the door against impact forces applied to the front or outside surface of the door.

The description of this operation has been with reference to a door. This should not be construed as limiting the application of the bar locking mechanism. The mechanism can be adapted wherever a moveable barrier is used to block an aperture.

Claims

1) A bar locking mechanism attached in such a manner to a door or window or other such opening that the said mechanism encompasses the full width of these openings and wherein a bumper plate or receiver bolt attached at one end of a supported rod assembly is deflected by the entry of a lock bolt into an aperture in the mechanism housing on the lock edge of the door or window and wherein a transmitter bolt attached at the other end of the said rod assembly is deflected into a strike plate or receptacle on the opposite or hinge edge of the door or window frame or other such opening.

2) A bar locking mechanism according to claim one (1) wherein the mechanism is housed in a metal or plastics casing which is mounted horizontally or vertically within the door or window frame or mounted horizontally or vertically on the back of the door or window frame between the edge of the frame closest to the hinge and the edge of the frame closest to the lock such that, when operated, the door or window lock bolt is inserted into the appropriate aperture in the mechanism casing.

3) A bar locking mechanism according to either claims 1 and 2 wherein a rod assembly is free to slide laterally along or within supportive guides mounted in a fixed position within the mechanism housing.

4) A bar locking mechanism according to any of claims 1 to3 whereln a bumper plate or receiver bolt attached to the end of the rod assembly is deflected by the movement of a lock bolt, or some other manually or electro-mechanically operated deflecting means, into the aperture in the housing in such a manner as to cause the rod assembly to slide along its supportive guides.

5) A bar locking mechanism according to any of claims 1 to 4 wherein the deflection of a bumper plate or receiver bolt attached to one end of a rod assembly results, through the sliding movement of the rod assembly, in the deflection of a transmitter bolt attached to the opposite end of the rod assembly.

6) A bar locking mechanism according to any of claims 1 to 5 wherein supportive guides contain the movement of the rod assembly in such a manner that this rod assembly may move only laterally along the mechanical housing and not be deflected up or down or back or forth within the mechanical housing when forces are applied in these directions.

7) A bar locking mechanism according to any of claims 1 to 6 wherein a coiled spring is co-axially mounted on the sliding rod assembly in such a manner that when the rod assembly is deflected by means of an external lock bolt or other deflecting means the coiled spring is compressed.

8) A bar locking mechanism according to any of claims 1 to 6 wherein a coiled spring mounted co-axially on the sliding rod assembly returns the sliding rod assembly to its original position when the external lock bolt or other deflecting means is removed from the bumper plate or receiver bolt aperture in the mechanism housing.

9) A bar locking mechanism according to any of claims 1 to 8 wherein a transmitter bolt or bolts are extended laterally and horizontally or vertically from the mechanism housing into morticed receiver apertures on the hinge edge of a closed door or window or other such opening at points remote from the door or window lock or other deflecting means.

10) A bar locking mechanism according to any of claims 1 to 8 wherein a transmitter bolt or

bolts are extended laterally and horizontally or vertically from the mechanism casing into receiver assemblies rim mounted on the back of a closed door or window or other such opening adjacent to the hinge edge of the door or window or other such opening at points remote from the door or window lock or other deflecting means.

11) A bar locking mechanism according to any of claims 1 to 8 wherein a transmitter bolt or bolts are extended laterally and horizontally or vertically from the mechanism housing into morticed apertures in the edge of or into rim mounted receiver assemblies mounted on the back of the door or window adjacent to the edge of the opposite door or window in a double door or double window arrangement.

12) A bar locking mechanism according to any of claims 9 to 11 wherein receiver plates or assemblies, similar to those found on the door or window frame of a normal door or window arrangement, are rim mounted or morticed on the back or edge of doors or windows and over receiver apertures in the doors and windows to accommodate a transmitter bolt or bolts.

13) A bar locking mechanism according to any of claims 1 to 12 wherein the transmitter bolts operating in a rim or morticed means from the mechanism housing deflect further bumper plates or other mechanical or electro-mechanical assemblies and thus cause further transmitter bolts to be deflected or other electrical or electronic assemblies to be operated.

14) A bar locking mechanism substantially as herein described with reference to the accompanying drawings.

Printed for Her Majesty's Stationery Office by the Courier Press, Leamington Spa, 1980. Published by the Patent Office, 25 Southampton Buildings, London, WC2A 1AY, from which copies may be obtained.